AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): A punching apparatus, comprising:

a male die, adapted to be opposed to a first face of a metallic plate member, the male die including a plurality of punches which are provided on the male die and arranged side by side in a first direction with a fixed pitch, the adjacent punches defining a gap therebetween, the gap continuing from a first side face that is a side face of one of the adjacent punches to a second side face that is a side face of the other of the adjacent punches in the first direction; and

a guide member, formed with a guide face which supports a side portion of the male die, at least when the punches are pressed into the plate member in a second direction, to form through holes therein, the guide member formed with projections that support at least one of the first side face and the second side face between which the gap continues in the first direction.

2. (original): The punching apparatus as set forth in claim 1, wherein the side portion of the male die extends in parallel with the first direction.

3. (original): The punching apparatus as set forth in claim 1, wherein the punches are arranged on a base member which is actuated so as to collectively press the punches into the plate member.

4. (original): The punching apparatus as set forth in claim 1, wherein:

each of the punches has a polygonal cross section including two sides which are parallel to the first direction; and

side faces of each of the punches corresponding to the two sides are supported by the guide member.

5. (canceled)

6. (previously presented): The punching apparatus as set forth in claim 1, wherein the projections are arranged such that two adjacent punches are placed between two adjacent projections.

7. (original): The punching apparatus as set forth in claim 6, wherein the projections are arranged such that at least one projection is placed between a gap defined in the two adjacent punches.

8. (original): The punching apparatus as set forth in claim 1, wherein the guide face and the projections are formed by grinding work.

9. (original): The punching apparatus as set forth in claim 4, wherein each of the punches has a rectangular cross section.

10. (previously presented): A punching apparatus, comprising:

a first male die, adapted to be opposed to a first face of a metallic plate member, the first male die including a plurality of first punches which are provided on the first male die and arranged side by side in a first direction with a fixed pitch, a distal end of each of which has a tapered shape, the first male die for forming recessed portions on the first face of the plate member;

a second male die, adapted to be opposed to a first face of the plate member, the second male die including a plurality of second punches which are provided on the second male die and arranged side by side in the first direction with the fixed pitch; and

a guide member, formed with a guide face which supports a side portion of the second male die, at least when the second punches are pressed into the plate member in a second direction, to form through holes therein,

wherein the second male die includes a first die for forming unpenetrated holes in the first face of the plate member, and a second die for punching the unpenetrated holes to form through holes communicated with a second face of the plate member which is opposite to the first face.

11. (original): The punching apparatus as set forth in claim 1, wherein the fixed pitch is 0.3 mm or less.

12. (original): The punching apparatus as set forth in claim 1, wherein a width of the hole is 0.2 mm or less.

13. (previously presented): The punching apparatus as set forth in claim 10, wherein a ratio of a distance between the first face and the second face with respect to a width of the hole is 0.5 or more.

14. (original): The punching apparatus as set forth in claim 1, wherein the first face is a portion of the plate member which has been subjected to a plastic working.

15. (original): The punching apparatus as set forth in claim 14, wherein the portion is a bottom face of a recess.

16. (original): The punching apparatus as set forth in claim 1, wherein the punches are adapted to be pressed into the plate member comprised of nickel.

17. (withdrawn): A plate member manufactured by the punching apparatus as set forth in claim 15.

18. (withdrawn): A liquid ejection head incorporating the plate member as set forth in claim 17, comprising:

a sealing plate, joined to the plate member so as to seal the recess to form a pressure generating chamber; and

a metallic nozzle plate, formed with a plurality of nozzles and joined to the plate member such that each of the nozzles is communicated with associated one of the through hole,

wherein liquid droplets are ejected from the nozzles by pressure fluctuation generated in liquid contained in the pressure generating chamber.

19. (previously presented): A punching apparatus, comprising:

a male die, adapted to be opposed to a first face of a metallic plate member, the male die including a plurality of punches which are provided on the male die and arranged side by side in a first direction with a fixed pitch, the adjacent punches defining a gap therebetween; and

a guide member, formed with a guide face which supports a side portion of the male die, at least when the punches are pressed into the plate member in a second direction, to form through holes therein, the guide member formed with projections that support at least one side face of each of the punches which faces the gap,

wherein the guide member is arranged movably in the second direction.

20. (original): The punching apparatus as set forth in claim 19, wherein:

the guide member is formed with a first face, a second face, and a through hole which communicates the first face and the second face;

the male die is inserted from an opening of the though hole at the first face, and allowed to move therein in the second direction; and

an inner face of the through hole serves as the guide face.

21. (original): The punching apparatus as set forth in claim 20, wherein the second face of the guide member is brought into contact with the plate member, so that the punches are

projected from an opening of the through hole at the second face when the through holes are formed.

22. (original): The punching apparatus as set forth in claim 21, wherein the guide member is arranged such that distal end face of the punches and the second face of the guide member are made flush with each other, before the second face is brought into contact with the plate member.

23. (currently amended): A punching apparatus as set forth in claim 15, ~~comprising:~~

~~a male die, adapted to be opposed to a first face of a metallic plate member, the male die including a plurality of punches which are provided on the male die and arranged side by side in a first direction with a fixed pitch, the adjacent punches defining a gap therebetween; and~~

~~a guide member, formed with a guide face which supports a side portion of the male die, at least when the punches are pressed into the plate member in a second direction, to form through holes therein, the guide member formed with projections that support at least one side face of each of the punches which faces the gap,~~

~~wherein the first face is a portion of the plate member which has been subjected to a plastic working,~~

~~wherein the portion is a bottom face of a recess, and~~

wherein the bottom face is a slope face.

24. (previously presented): A punching apparatus, comprising:

a male die, adapted to be opposed to a first face of a metallic plate member, the male die including a plurality of punches which are provided on the male die and arranged side by side in a first direction with a fixed pitch, the adjacent punches defining a gap therebetween;

a guide member, formed with a guide face which supports a side portion of the male die, at least when the punches are pressed into the plate member in a second direction, to form through holes therein, the guide member formed with projections that support at least one side face of each of the punches which faces the gap, wherein the punches are arranged on a base member which is actuated so as to collectively press the punches into the plate member; and

a fixation member, to which the male die is fixed, wherein:

the base member includes a first part integrated with the punches, and a second part continued from the first part and fixed at the fixation member;

the first part has a higher rigidity than a rigidity of the punches,

wherein, in parallel with the first direction, a first cross sectional area of the first part is larger than a cross sectional area of the punches; and

the second part has a second cross sectional area in parallel with the first direction which is larger than the first cross sectional area.

25. (original): The punching apparatus as set forth in claim 24, wherein the guide member supports the first part of the base member.

26. (original): The punching apparatus as set forth in claim 24, wherein the fixation member is formed with a retainer which restricts a movement of the second part of the base member in the second direction.

27. (previously presented): A punching apparatus, comprising:

a male die, adapted to be opposed to a first face of a metallic plate member, the male die including a plurality of punches which are provided on the male die and arranged side by side in a first direction with a fixed pitch, the adjacent punches defining a gap therebetween; and

a guide member, formed with a guide face which supports a side portion of the male die, at least when the punches are pressed into the plate member in a second direction, to form through holes therein, the guide member formed with projections that support at least one side face of each of the punches which faces the gap,

wherein the guide member is formed with a step portion which supports at least one side face of the outermost punches in the first direction, which is opposed to the gap.

28. (previously presented): The punching apparatus as set forth in claim 1, wherein the projections are held in contact with the at least one of the first side face and the second side face.

29. (previously presented): The punching apparatus as set forth in claim 1, wherein the guide member comprises:

a first guide member; and

a second guide member, separated from the first guide member, where the first and second guide members face each other via the punches.

30. (previously presented): A punching apparatus, comprising:

a male die, adapted to be opposed to a first face of a metallic plate member, the male die including a plurality of punches which are provided on the male die and arranged side by side in a first direction with a fixed pitch, the adjacent punches defining a gap therebetween; and

a guide member, formed with a guide face which supports a side portion of the male die, at least when the punches are pressed into the plate member in a second direction, to form through holes therein, the guide member formed with projections that support at least one side face of each of the punches which faces the gap,

wherein the guide member comprises:

a first guide member; and

a second guide member, separated from the first guide member, where the first and second guide members face each other via the punches, and

wherein each of the first guide member and the second guide member is formed with the projections.

31. (previously presented): The punching apparatus as set forth in claim 30, wherein each of the first guide member and the second guide member is formed with a step portion that supports at least one side face of the outermost punches in the first direction, which is opposed to the gap.

32. (previously presented): The punching apparatus as set forth in claim 30, wherein the projections are arranged such that two adjacent punches are placed between two adjacent projections.

33. (previously presented): The punching apparatus as set forth in claim 32, wherein the projections of the first guide member do not face the projections of the second guide member.

34. (previously presented): The punching apparatus as set forth in claim 32, wherein the projections are arranged such that at least one projection is placed in a gap defined between the two adjacent punches.